

**Remarks**

Claims 28-31, 36-42, 50, 51, 55, 57-62, 66, 69-71, 73-82 and 84, 85, 86-91 and 93-97 are pending in the application.

The independent claims, and thereby all of the claims, have been amended to recite that the pH of the solution is in the range from about 4.5 to about 5.5. Support for this amendment may be found, for example, at page 5, line 14 of the specification.

Claims 68, 86 and 92 have been canceled herein.

New claims 94-97 are added herein. Support for the new claims may be found, for example, in the specification at page 4, lines 11-15.

Applicants respectfully request reconsideration of the claims of the present application based on the foregoing amendments and the following points.

**Rejections of Claims**

The claims of the present application have been rejected as obvious over the asserted combination of U.S. Patent No. 2,580,773, to Heiman, with U.S. Patent No. 5,405,523, to Eckles, and further in view of U.S. Patent No. 2,892,760 to Gündel or U.S. Patent No. 3,960,677 to Hildering, and in some cases, with the addition of Haydu. In addition, the claims of the present application have been rejected as obvious over the asserted combination of JP 2000-256864 ("JP '864"), with U.S. Patent No. 5,182,006, to Haydu, and further in view of Gündel or Hildering.

Applicants respectfully traverse these rejections for at least the following reasons. Applicants reiterate and incorporate herein by reference the previously submitted arguments against the combinations of Heiman and Eckles, and against the combination of JP '864 and Haydu. The recent addition of Gündel or Hildering fails to render obvious the presently claimed invention any more than did the originally and previously asserted bases for rejection of Applicants' claims. Applicants respectfully submit that the contended combinations of prior art references do not provide the requisite factual support for the asserted *prima facie* obviousness. Applicants respectfully submit that for the reasons shown in the accompanying Declaration of Nayan H. Joshi, even if a person of skill in the art would have attempted to make the combinations contended by the Examiner to have been obvious, the presently claimed invention would not have been obtained. Therefore, even if the Examiner had stated a

*prima facie* case of obviousness, any possible *prima facie* case of obviousness is fully rebutted by the facts shown in the Declaration submitted herewith. The facts in the Declaration submitted herewith show that, even combining the teachings of the references as contended by the Examiner, the asserted combination would not provide the claimed process, the present invention would not be obtained, and therefore, the presently claimed invention would not have been obvious.

In addition, the amendment of the claims to specify the pH range from about 4.5 to about 5.5 further distinguishes the present invention from the prior art.

In addition, new claims 94-97 further distinguish over the prior art.

#### **Discussion of Facts Shown in Declaration of Nayan H. Joshi Under 37 CFR 1.132**

Applicants submit herewith the Declaration of Nayan H. Joshi under 37 CFR 1.132. Dr. Joshi is an inventor on the present application and is a person of skill in the art of metal finishing and, in particular, in the art of immersion plating, in the deposition of zinc and nickel and/or cobalt upon aluminum or aluminum alloy substrates.

In summary, the facts shown in the Declaration clearly show that the contended combination of prior art references, asserted by the Examiner as having rendered Applicants' claimed invention obvious, would not have done so, because the contended combination would not have worked and would not have resulted in Applicants' claimed invention.

As set forth in paragraphs (3) and (4) of the Declaration, Dr. Joshi has reviewed the rejections, the prior art upon which the rejections are based and the Examiner's rationalizations for making the contended combinations and for her conclusion that the claimed invention would have been obvious.

As set forth in paragraph (5), Dr. Joshi, as a person of skill in the art, strongly disagrees with the Examiner's contended combination of the references and with the Examiner's conclusion that the combination provides a basis for the contended *prima facie* obviousness of the claimed invention.

As set forth in paragraph (6), in order to show that the claimed invention would not have been obtained by the contended combination of prior art references, and to show that the claimed invention would not have been obvious, Dr. Joshi and the Applicants have conducted a series of experiments, reported in the following

paragraphs of the Declaration. The experiments were intended to show that there is no basis in fact for the Examiner's contention that compositions useful for immersion plating could be readily interchanged with compositions useful for electroplating, and that any ingredient known for use in one could be directly applied for use in the other. As Applicants have argued throughout the prosecution of this application, such an assertion is factually incorrect and would not be accepted by any person of skill in the metal finishing art.

As set forth in paragraph (7), a total of eight different compositions were prepared and applied to aluminum coupons in both immersion plating processes and in electroplating processes. The first seven of the compositions were intended to duplicate compositions of the prior art, either of the primary references alone, or of the references in the combinations contended by the Examiner to have been obvious. The eighth composition corresponds to an embodiment of the present invention.

It is noted that the primary purpose of these tests was to show that the contended combinations would not work, as opposed to showing that, aside from the fact that it does work for its intended purpose while the other combinations did not, the present invention provides unexpected benefits. In essence, the unexpected benefit of the present invention is that it does work, while all of the contended combinations of the prior art do not work. Furthermore, the tests were intended to show that, in fact, compositions useful for immersion plating are not useful for electroplating, and conversely that components of compositions useful for electroplating would not be used in immersion plating based on their usefulness in electroplating.

As shown in paragraph (8) of the Declaration, when each of the eight compositions were applied by immersion plating, followed by electroless nickel plating, all of the first seven failed in the 90° bend test, and only the present invention produced a coating that did not suffer from lift-off. The 90° bend test is a simple test to check the adhesion of the immersion and electroless plated metal layers to the base substrate. A flat thin coupon of the base metal (here the aluminum coupon) is used for plating with immersion plating followed by electroless nickel. The typical total plating thickness is 25-30 microns. After the plated coupon is subjected to the 90° degree bending, the outer and inner surfaces of the bent area (the "elbow") are

checked visually for flaking/peeling. The results are shown in the photographs in paragraph (10).

As shown in paragraph (9) of the Declaration, when each of the eight compositions were subjected to electroplating conditions in a Hull cell, none of them provided good plating results. This is consistent with the fact that all eight compositions, at least the teachings of the primary reference relate to compositions that are actually intended for use as immersion plating. Thus, these immersion plating compositions would not be expected by the person of skill in the art to perform well in electroplating applications. These results show that the Examiner's contentions, that brighteners or any other component of an electroplating composition is readily exchangeable for use in immersion plating, are clearly erroneous and without support of any substantial evidence. The electroplating results are shown in the photographs in paragraph (10), in which it is clear that poor electroplating results from these modified immersion plating solutions.

Paragraph (10) includes photographs of the 90° bend test results and the electroplating results, for the immersion plating/electroless nickel tests and for the electroplating results. As noted, from even a brief review of the Figs. 1-8, it is quite clear that acceptable results are only obtained with a composition and process in accordance with the present invention.

As stated in paragraph (11), the test results show that the selection of a chemical composition for use as a replacement for the conventional zincate process is not a simple matter of selecting any superficially similar prior art composition and arbitrarily modifying it.

As stated in paragraph (12), the test results show that, even though the composition of the present invention works well as an immersion plating replacement for the zincate process of the prior art, this composition does not work in electroplating processes. This again shows that the Examiner's contentions relating to the interchangeability of immersion plating and electroplating are clearly erroneous and without support of any substantial evidence.

As stated in paragraph (13), the test results show that the chemical compositions of the prior art, even when modified and combined as contended by the Examiner, totally fail to function as an acceptable zincate replacement process.

As stated in paragraph (14), the test results show that any arbitrarily selected mercapto-substituted nitrogen containing heterocyclic compound does not necessarily work as a brightener in an electroplating process. As Applicants have argued and shown factually previously, this is a well known fact in the metal finishing art. Applicants respectfully submit that the Examiner's contentions to the contrary are clearly erroneous and without support of substantial evidence.

As stated in paragraph (15), the test results shown in the Declaration clearly and fully rebut any possible *prima facie* case of obviousness that may have been stated by the Examiner in this application. In summary, it would not have been obvious to any person of ordinary skill in the art to have made the presently claimed invention based on the teachings of the prior art cited and relied upon by the Examiner.

As stated in paragraph (16), the basic combination of Heiman and Eckles, even without the addition of Gündel or Hildering, would not have been obvious to the person of ordinary skill in the art at the time the present invention was made.

As stated in paragraph (17), the basic combination of JP '864 and Haydu, even without the addition of Gündel or Hildering, would not have been obvious to the person of ordinary skill in the art at the time the present invention was made.

Finally, as set forth in paragraph (18), no person of ordinary skill in the art would have found it obvious or in any way suggested or otherwise been motivated to employ in an immersion plating process a brightener disclosed only for use in an electroplating bath, and that had such a brightener been added to the baths of the prior art references cited by the Examiner, no good result would have been obtained, and thus the present invention would not have been obtained. Simply stated, the presently claimed invention would not have been obvious over the contended combination of Heiman and Eckles, in view of either Gündel or Hildering, or over the contended combination of JP '864 and Haydu, in view of either Gündel or Hildering.

Accordingly, Applicants respectfully request the Examiner to reconsider and withdraw the rejections of Applicants' claims for the reasons set forth in the Office action to which this paper is responsive, and in the previous Office actions.

**Conclusion**

In view of the facts shown in the Declaration of Dr. Joshi and the foregoing remarks, it is respectfully submitted that all of the claims presently in the application fully patentably distinguish over the prior art and are in condition for allowance. Notice to such effect is respectfully requested.

In the event issues arise as a result of the filing of this paper, or remain in the prosecution of this application, Applicants request that the Examiner telephone the undersigned attorney to expedite allowance of the application.

Applicants submit that no additional claim fees are due for the newly added claims. A total of 46 claims, including 4 independent claims, are presently pending in the application, upon entry of the present Reply. The claim fees for a total of 49 claims, including 3 independent claims, was paid when the application was originally filed on 26 June 2003. The additional fee for one additional independent claim was paid in the Reply to Office Action Mailed 25 February 2005, which was filed by Applicants on 03 March 2005. Accordingly, no additional claim fee are believed due for the filing of this paper.

Should a further Petition for Extension of Time be necessary for the present Reply to the outstanding Office action to be timely filed (or if such a petition has been made and an additional extension is necessary) petition therefor is hereby made and, if any additional fees are required for the filing of this paper, the Commissioner is authorized to charge those fees to Deposit Account #18-0988, Docket No. ATOTP0104US.

Respectfully submitted,  
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